OTOLOGY.

UNDER THE CHARGE OF

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THE ACOUSTIC VALUE OF THE AURICLE.

In a case of traumatic defect of the auricle, in a man forty-six years old, **BÜRKNER** embraced the opportunity to test the acoustic function of the auricle (*Archiv für Ohrenheilkunde*, Bd. xxii. p. 201, Aug. 1885). He corroborated the observation of Kessel (*Ibid.*, Bd. xviii. p. 120), viz., that the auricle is of value in the perception of sound, so long as the latter does not fall upon the ear, in the direction of the axis of the external auditory canal. The part played by the auricle, in the perception of quality of sound, as set forth by Mach, C. H. Burnett, and Brown, the author could not test, as the patient possessed no musical sense. Bürkner, however, was able to determine that the auricle has power to aid in the detection of the direction of sound. How far the hearing in this case would have been modified by the loss of the tragus, which, according to Politzer and others, possesses a certain influence in hearing, was not determined. The case, however, was confirmatory of the view that the *auricle aids in the recognition of the direction of sound, and in the accurate perception of sound which does not fall directly upon the ear in the line of the axis of the auditory canal.*

THE COMPARATIVE RESULTS OF DIFFERENT METHODS OF TESTING THE HEARING.

PROF. BURCKHARDT-MERIAN, in a paper read at the Third International Otological Congress, Basle (*Archiv f. Ohrenheilk*, Bd. xxii. pp. 177–194), admits the existing want of a fixed test for the hearing, and is inclined to the views of Wolf, that the human voice is the best test at our command; but, in addition to the voice, he thinks we have other means of testing which should be employed in conjunction with the voice-tests.

According to his view, a perfect acoumeter should possess the following characteristics:

1. Exact power of determining the functions of the acoustic nerve, so that different observers in different countries can record the results in exactly the same manner.
2. The power to determine accurately the result of treatment.
3. Accuracy in deciding the position and the prognosis of the disease, from the result of the test of hearing.
4. Employment of the facts obtained from post-mortem examinations, and, hence, the ability to explain pathological discoveries, and aid in the perfecting of the physiology of the acoustic nerve.

"Such an instrument does not, and probably never will exist. In comparison with such, the finest musical instrument in existence is but a child's toy."

The author's mode of testing the hearing is as follows:

First. With Politzer's acoumeter, which has become with many aurists a substitute for the watch.

Secondly. The test with speech is carried out by whispered words at a maximum distance of six metres, which is considered the limit of normal hearing for words thus uttered.

Thirdly. A test is essayed by means of high notes, in which are employed König's rods, ut^7 or c$^5 = 8192$ vibrations a second, up to ut^{10} or c$^8 = 65,536$ v. s. By this means even the most unmusical person can be easily tested.

Finally. A test for the perception of Galton's pipes is made. These furnish notes of from 6461 to 84,000 simple vibrations per second. They have the good quality of being small and convenient, and of maintaining their notes quite a long time, which is not possessed by the König rods. Such a pipe knows no interval, so that lacunæ in the perception of notes can be detected.

It appears that the width of the auditory canal has no influence on hearing.

The results of Burckhardt-Merian's acoustic tests are as follows:

I. In a series of cases it is shown that in persons of all ages, affected in hearing, bone conduction is so powerful that the finest closure of both auditory canals cannot effect a weakening of perception of König's rods nor of Galton's pipes.

II. Generally (especially in children) a collection of cerumen does not reduce the hearing for the test-rods or Galton's pipes, yet the reverse is not unfrequently the case, so that with a collection of wax combined with deafness for high notes, it is impossible to make a conclusion as to a possible further affection of the auditory apparatus. In cases of obstruction of the ear by collections of cerumen, the perception of whispers is chiefly interfered with, while that for the acoumeter is less so.

III. Exudation in the tympanic cavity interferes in the greatest degree with the perception of whispering, and often also that of the acoumeter, but only in rare instances with the hearing of high notes, and then perhaps it is due to pressure upon the round window.

IV. Perforations in the membrana tympani, even when the malleus and anvil are destroyed, increase the perception of high tones, but disturb chiefly the hearing for whispers, less than for the acoumeter. Conversely there occurs, especially in the loss of the anvil, a delicacy of hearing for whispers, while loud words are heard with difficulty.

V. Excessive hydrostatic pressure in the labyrinth diminishes in the highest degree the perception of high tones, and also nullifies in general the hearing powers. If, however, in such cases the hearing remains normal, or not markedly diminished, it is to be referred to the regulation of the entotic pressure effected by the aqueducts.

VI. If with relatively normal hearing for whispers and the acoumeter, high notes are either not perceived, or only imperfectly so, it indicates an affection of the cochlea. Thus, after exposure to explosions, discharge of firearms, loud locomotive whistles, etc., in addition to feeling uncomfortable in the ear, it is found that those thus exposed do not perceive accurately high notes, while they continue to hear normally both the acoumeter or watch and whispered words. It is entirely justifiable, in the author's opinion, to refer the lesion in such cases to the cochlea.

VII. Adhesive processes, which diminish or greatly reduce the perception of whispered words, also impair the hearing for high notes. In such cases the note G^6 Sol^8 constitutes the highest limit.

VIII. When in those who are very hard of hearing an abnormally acute hearing for high notes can be detected, while speech conveyed to them by means of the hearing trumpet is not well understood, there is every probability that the case is one of anchylosis of the stapes.

IX. An equal reduction of hearing for the acoumeter, whispers, metallic rods, and Galton's pipes, may be considered an evidence of disease of the internal ear.

X. Relatively good perception for high notes with simultaneous deafness for low notes, sometimes accompanies the most intense forms of deafness.

XI. Galton's pipes are indispensable in the discovery of lacunæ in the scale of perception of notes.

XII. Deaf-mutes and very deaf subjects may still retain relatively good hearing for high notes.

THE ACTION OF COCAINE IN EAR DISEASES.

DR. F. KRETSCHMANN, of Halle (*Archiv für Ohrenheilk.*, Bd. xxii. p. 243), KIRCHNER (*Deutsche med. Wochenschrift*), ZAUFAL (*Præger med. Wochenschrift*, No. 7, 1885), DR. A. G. HOBBS, of Atlanta, Ga. (*Archives of Otol.*, vol. 14, p. 109), and DR. C. H. BURNETT (*Trans. Amer. Otol. Soc.*, July, 1885) have given testimony as to the negative results with cocaine in its local action in painful diseases of the ear.

Kretschmann employed in all his cases a five per cent. solution of the hydrochlorate. The application was effected either by instillation or by soaking cotton and passing the latter down the auditory canal upon the membrana tympani, or upon a point chosen for incision. The period allowed for the application to take effect was not less than fifteen minutes, nor more than twenty minutes. In affections of the nares and nasopharynx, the application was made by the camel's-hair brush directly to the spot to be anæsthetized, and the operation repeated, if necessary, every five minutes. The conclusions are as follows:

1. In operations on the membrana tympani, the anæsthetic action of cocaine (five per cent. solution) is uncertain.
2. In operations on the tympanic mucous membrane, cocaine has an anæsthetic effect. It fails, however, if the cut be deep enough to involve the subjacent bone.
3. In operations on the nasal mucous membrane, cocaine has both an anæsthetic effect and one which abrogates reflex susceptibility.
4. In rhinoscopy, cocaine allays gagging and relaxes the soft palate.

Kirchner began his observations with a two per cent. solution, but found that nothing weaker than a twenty per cent. solution was sufficient to produce anæsthesia of the membrana tympani. But, even with this strong solution, the result is by no means certain, an experience similar to that of Zaufal, who has had negative results in producing anæsthesia of the membrana tympani with solutions of cocaine. But he finds that, in large perforations of the membrana, the mucous membrane can be reached and anæsthetized by cocaine, so that granulations can be removed without pain.